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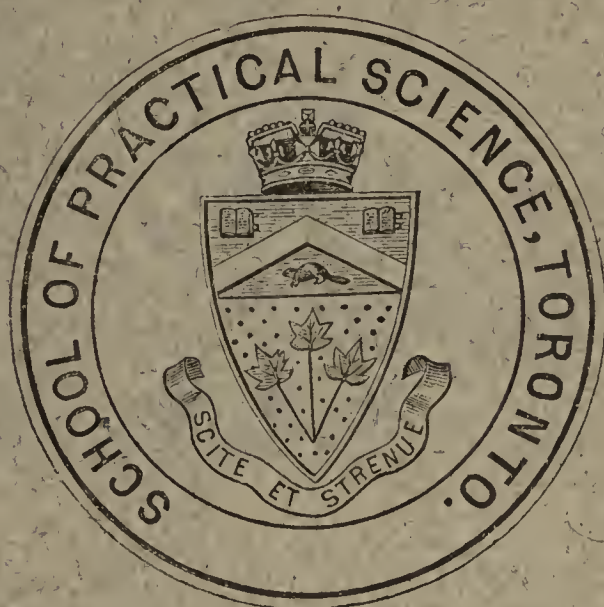
Toronto, University of Faculty
Applied Science and Engineering

Calendar
SCHOOL

—OF—

Practical Science,

PROVINCE OF ONTARIO.



1878-79.



Toronto:

PRINTED BY HUNTER, ROSE & CO., 25 WELLINGTON STREET WEST.

1878.

PROSPECTUS
OF THE
SCHOOL OF PRACTICAL SCIENCE,
PROVINCE OF ONTARIO,
WITH A
SYLLABUS
OF THE
COURSES OF INSTRUCTION AND OF THE REGULATIONS
FOR
DIPLOMAS.



FIRST SESSION 1878-79.

TORONTO :
PRINTED BY HUNTER, ROSE & CO., 25 WELLINGTON STREET WEST.
1878.

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Faculty of the School.

H. H. CROFT, D. C. L. *Professor of Chemistry.*

E. J. CHAPMAN, Ph. D., LL.D. *Professor of Mineralogy and Geology.*

JAMES LOUDON, M. A. *Professor of Mathematics and Natural Philosophy.*

R. RAMSAY WRIGHT, M. A., B. Sc. *Professor of Biology.*

Professor of Engineering.

W. H. ELLIS, M. A., M. B. *Assistant to the Professor of Chemistry.*

Secretary of the Board,

Prof. R. RAMSAY WRIGHT,

To whom application may be made for information further than that contained in the present Prospectus.

School of Practical Science,

PROVINCE OF ONTARIO.

PROGRAMME FOR THE SESSION 1878-9.

In the Session of 1877 the Legislative Assembly, by Resolution, sanctioned the proposals for the permanent establishment of the School contained in the memorandum of the Minister of Education, dated the 30th day of January, 1877, and approved by the Lieutenant-Governor in Council, on the 3rd day of February, 1877.

These proposals were in effect that the Government, instead of appointing and paying a distinctive professional staff for giving the special instruction which the School (the former College of Technology) was founded to afford, should utilize the teaching power of University College, which already existed for the like objects in four departments, and could be made applicable to the wants of this Science School; and in addition thereto should appoint a Professor of Engineering and such Assistants in the several departments as might be required in supplementing the work of the College Professors.

The building purchased for the former College of Technology was unsuitable in its structure, and could not afford the laboratory and other accommodation required for instruction of this special nature, and, indeed, did not possess the requisite appliances or apparatus. It became necessary, therefore, that a new building should be erected upon a site in proximity to the Provincial University. By this plan, it was considered that an economical mode could be adopted of establishing an Institution which, while not comparing with the larger and more expensive ones of Europe and the United States of America in the technical training of its students, would be able, nevertheless, to supply a want in our Educational System, and afford a thoroughly practical education in physical science with a direct bearing on the professions or occupations which they might wish to follow. It would thus in fact become a *School of Practical Science*, and as such would secure benefits commensurate with the moderate expenditure for its establishment and maintenance.

The arrangements consequent upon this Resolution of the House of Assembly have now been completed, and the new building is ready for occupation. It contains commodious Chemical, Assaying, Physical and Biological laboratories, Chemical and Engineering Lecture Rooms, Designing and Drawing Room, Apparatus and Model Rooms in addition to private laboratories, store-rooms, balance rooms and experimental rooms, and is being furnished with requisite fittings and apparatus in the several departments.

The Government is about to secure the services of a Professor of Engineering and also of an Assistant in Chemistry, while the Professors of Chemistry, of Natural Philosophy and Mathematics, of Geology and Mineralogy, and of Natural History and Botany in University College, are ready to supply instruction in their respective departments.

The position which it is intended the School of Practical Science shall satisfactorily occupy in our Educational System may be indicated as follows:—

Firstly.—Students, who have passed through the regular courses of the School, will be enabled to prosecute professionally, (1) Engineering; (2) Assaying and Mining Geology, or (3) Analytical and Applied Chemistry. With this view the Diploma admitting to the standing of “Associate of the School,” will be granted in each of these branches after due examination.

In Engineering, it is intended that the instruction shall afford a thoroughly scientific basis for operations in the field. In the absence of a Machine Shop and of facilities for visits to Mines during Session, visits to workshops and excursions during the long vacation will be taken advantage of. As far as possible, the instruction in all the branches of engineering will be of a thoroughly practical character.

The establishment of a Diploma for special qualifications in Assaying and Mining Geology, apart from the knowledge of these subjects incidental to the course in Mining Engineering is sufficiently called for by the necessity which exists for the development of the mineral wealth of the Province. Students who pass through the course necessary to obtain this Diploma will have acquired the knowledge requisite for inspecting and surveying mineral lands, as well as the ability to report accurately on the composition and value of economic minerals generally.

The importance of the study of Chemistry is now fully recognised, and in Canada, through the Public Analysts and otherwise, protection is being secured to consumers, while the producers are necessarily brought to recognise its importance. The course in Chemistry will be such as to fit the student for the position of Public Analyst or of Consulting or Resident Chemist.

Secondly.—It is proposed to furnish preliminary scientific training for students entering the professions of Surveying and Medicine. The Certificate to be granted in Surveying will be attainable by one year's study, and it is intended that this should entitle its possessor to appear one year earlier for his examination as Provincial Land Surveyor.

The School of Practical Science in relation to the Medical Schools of the Province, may well supply recognised deficiencies in affording scientific training beyond what is merely necessary for a license to practice, but which should be required for a good University Degree in Medicine.

Thirdly. It is proposed to give every opportunity to persons desirous of instruction in any of the subjects of the school, by attending as *occasional students*.

EXTRACTS FROM REGULATIONS,

Approved by His Honour the Lieutenant-Governor in Council, 28th June, 1878.

1. The Board to whom the internal management and discipline of the School is intrusted is composed of the Lecturers and Instructors therein, with Chairman and Secretary as nominated by the Lieutenant-Governor in Council.
2. The academic year consists of two terms. The Michaelmas Term extends from 1st October to 23rd December ; the Easter Term from 8th January to 18th April.
3. A Diploma entitling to the standing of "Associate of the School," will be given to each student, who shall have completed, to the satisfaction of the Faculty, any one of the Regular Courses of the School.
4. The Regular Course for the Diploma of the School in each Department is three years in duration.
5. Students who propose to obtain the Diploma of the School must pass an Entrance Examination in the subjects of the Intermediate High School Examination. The Board will give credit for such of these subjects as have been passed by the students at any examination for Public School Teachers of any class, or at any Matriculation Examination in any University in Ontario, or at any Terminal Examination in University College, or at the Entrance Examinations of the Law Society, or the College of Physicians and Surgeons of Ontario.
6. Certificates of attendance and standing, when satisfactory, will be issued for any separate course or group of courses, provided that the student shall have passed an entrance examination, equivalent to that for Third Class Public School Teachers' Certificates.
[This is applicable to those who take advantage of the courses for Surveyors or Medical Students.]
7. At the conclusion of each academic year, examinations will be held in each of the subjects taught, and prizes will be awarded for excellence in each branch. Candidates for Diplomas and Certificates are required to enter for these.
8. All Regular Students are required to be in attendance at the school during the whole of each term, unless exempted by special permission of the Board. The term will not be allowed to any student who has attended less than three-fourths of the required Lectures and practical Lessons, or who has been reported to the Board for bad conduct, and adjudged guilty thereof.
9. Students of the School of Practical Science shall attend such courses of Lectures as are delivered by the Professors of University College to the students thereof, so far as applicable to both classes of students, while instruction of a practical character in the Department of Engineering will be specially appointed for students of the School.
10. Occasional students may be permitted to attend such lectures or courses of instruction, or of practical work as the Board may think proper.

REGULAR COURSES FOR THE DIPLOMA.

See especially regulations, 3, 4, 5, 7, p. 7.

The fee (payable in advance to the Provincial Treasurer) for each term's instruction, in any one of the Departments, is Twenty-five Dollars. There is no extra fee for the Diploma.

The following are the Departments in which the Diploma is granted :—

- (1) Engineering (Civil, Mechanical and Mining).
 - (2) Assaying and Mining Geology.
 - (3) Analytical and Applied Chemistry.
-

(1) DEPARTMENT OF ENGINEERING.

This course is intended to qualify students to prosecute the various professional branches of Engineering. During the *first two* years the course is for the most part common to the students of all three branches (Civil, Mechanical and Mining Engineering). In the course of the second year, however, the student is required to select such one of the three Branches which he intends to specially pursue, and the studies of the third year are arranged in conformity therewith.

SUBJECTS OF THE FIRST YEAR :

- 1 MATHEMATICS,
Including Plane Trigonometry and Analytical Conic Sections.
2. MECHANICS,
Elementary Statics and Calculations of Framed Structures.
3. DRAWING,
Free-hand, Linear and Elementary Projection.
4. SURVEYING,
Chain and Compass. Plotting from notes.
5. CONSTRUCTION,
General Principles and Foundations.
6. ELEMENTARY CHEMISTRY.

SUBJECTS OF THE SECOND YEAR :

A.—Common to the three Branches.

1. MATHEMATICS,
Differential and Integral Calculi and Spherical Trigonometry.
2. DRAWING,
Free-hand, and Descriptive Geometry.
3. PHYSICS,
Statics and Dynamics, Hydraulics and Optics.
4. MENSURATION.
5. ELEMENTARY MINERALOGY AND GEOLOGY.

B.—Special Subjects for each Branch.

CIVIL.	MECHANICAL.	MINING.
Geodesy and Astronomy. Surveying.—Theodolite, level, &c. Construction.—Roads and Railways.	Machinery. Designing.	Crystallography. Palæontology. Determinative Mineralogy. Blowpipe Analysis. Surveying.

SUBJECTS OF THE THIRD YEAR :

CIVIL.	MECHANICAL.	MINING.
Surveying.—Railway and Canal surveying. Hydrography. Free-hand drawing. Applied mechanics.—Resistance of material structures in stone, wood and iron. Hydraulics. — Water supply. Drainage. Mineralogy. — Determination of minerals. Minerals of Ontario. Metallurgy.—Manufacture of Iron and Steel. Construction. — Bridges, Canals & Harbours. Steam Engines. Experimental Physics. Designing and Estimates.	Physics.—Mechanical Theory of Heat. Free-hand drawing. Applied Mechanics.—Resistance of materials. Structures in stone, wood and iron. Machines —Proportions and parts. Motors.—Steam and hydraulic engines, and pumping machinery. Mineralogy. — Determination of minerals. Minerals of Ontario. Metallurgy. — Manufacture of Iron and Steel. Experimental Physics. Designing and Estimates.	Assaying and Ore dressing. Crystallography, Geology and Palæontology. Mining Geology. Mining.— Processes employed, &c. Mining Machinery. Motors.—Steam and hydraulic engines, and pumping machinery. Metallurgy. Chemistry. Experimental Physics.

(2) DEPARTMENT OF ASSAYING AND MINING GEOLOGY.

In this Department the student is fully prepared in all the methods of analysis necessary to render him a competent Assayist. He is also qualified to survey and report upon the value of mineral lands.

SUBJECTS OF FIRST YEAR :

1. Elementary Mathematics, including Mensuration and Plane Trigonometry.
2. Elements of Natural Philosophy, including Mechanics, Hydraulics.
3. Inorganic Chemistry.
4. Elementary Mineralogy and Blowpipe Practice.
5. Elementary Biology.
6. Physical Geography, Palæontology and Geology.
7. Drawing.

SUBJECTS OF SECOND YEAR :

1. Higher Mathematics, including Spherical Trigonometry, &c.
2. Chemistry, with laboratory practice in Qualitative Analysis.
3. Blowpipe Analysis and Determinative Mineralogy.
4. Geology and Economic Minerals of Canada.
5. Surveying and Levelling.

SUBJECTS OF THIRD YEAR :

1. Quantitative Chemical Analysis.
 2. Metallurgy.
 3. Assaying.
 4. Study of Metallic Veins and other Mineral Deposits, Mining Calculations, Examination of Mineral Lands.
-

(3) DEPARTMENT OF ANALYTICAL AND APPLIED CHEMISTRY.

This course is intended to render the student proficient in all the methods of Analytical Chemistry, and to fit him for such positions as that of Public Analyst, Consulting Chemist in regard to manufactures, or Resident Chemist in manufactories where such is required.

SUBJECTS OF FIRST YEAR :

1. Mathematics and Plane Trigonometry.
2. Natural Philosophy with work in the Laboratory.

3. Elementary Biology.
4. Elementary Chemistry with work in the Laboratory.

SUBJECTS OF SECOND YEAR :

1. Elementary Mineralogy and Geology.
2. Blowpipe practice and Assaying.
3. Advanced Chemistry with Laboratory work in Qualitative, Quantitative and Volumetric Analysis.

SUBJECTS OF THIRD YEAR :

1. Applied Chemistry.
2. Organic Chemistry.
3. Laboratory Work, including Technical Analysis, Quantitative Mineral Analysis, a prescribed course in Physiological Chemistry, and in Chemistry in its relation to Hygiene and Forensic Medicine.

PROVISIONAL TIME TABLE FOR STUDENTS OF THE REGULAR COURSE.—FIRST YEAR.

	Dept. of Engineering.					Dept. of Assaying and Mining Geology.					Dept. of Analyt. and Appl. Chem.				
	M.	T.	W.	Th.	F.	M.	T.	W.	Th.	F.	M.	T.	W.	Th.	F.
Mathematics	12	12	12	12	10	12	12	12	12	10	12	12	12	12	10
Natural Philosophy.....		1			1	10		10			10	1	10		1
Elementary Chemistry	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
Practical Chemistry.....									Hours to		be arranged.				
Elementary Biology.....	9		9		9	9		9		9	9		9		9
Mineralogy and Geology.....						3		3		3					
Practical Mineralogy & Geology.						Hours to be arranged.									
Drawing	2-4		2-4		2-4	1-3		1-3		1-3					
Mechanics.....	10		10												
Surveying.....	1		1												
Construction		2		10											
French		9		9			9		9			9		9	
German		10		1			10		1			10		1	

COURSE FOR THE CERTIFICATE IN SURVEYING.

The Course requires one academic year for its completion. The fee for the course is \$40. See especially Regulations 6 and 7.

The following are the subjects of instruction (with time table), in all of which except French and German, an examination must be passed by the student before the Certificate is granted to him :

	M.	T.	W.	Th.	F.
Mathematics.	12	12	12	12	10
Drawing.	9-11	1-3	9-11	10-12	.....
Surveying and Levelling	1	11	1	11	1
Geodesy and Astronomy	2-3	.....	2-3	.....	.....
Mineralogy and Geology	3	3	3	3	3
Mensuration.....	11	.....	11	.....	11
French ..... .	.....	9	.....	9	.....
German.....	.....	10	.....	1	.....

COURSES SUITABLE FOR MEDICAL STUDENTS.

In arranging the synopsis which follows, the Board has been guided by the new Medical Curriculum of the University of Toronto. The Board proposes to provide instruction in all the extra-professional and more purely scientific studies there laid down, and it does so in the hope that Medical Students may be able to take advantage of the commodious laboratory accommodation which is provided in each Department, and acquire that personal familiarity with the use of Physical and Physiological apparatus which forms such an admirable training for the scientific medical man.

Separate certificates of attendance are given for each course—didactic and practical. The courses, as to duration, comply with the regulations of the University of Toronto.

No fees are charged for the lectures if taken along with the practical courses. The Fee for each practical course is \$10. See Regulations 6 and 7.

DEPARTMENT OF CHEMISTRY.

A. LECTURES.

- 1. Course on Inorganic Chemistry and Chemical Physics.
- 2. Course on Organic Chemistry.

B. PRACTICAL COURSES.

- 1. Elementary Laboratory Practice.
- 2. Physiological Chemistry.
- 3. Chemistry in relation to Hygiene and Forensic Medicine.

DEPARTMENT OF BIOLOGY.

A. LECTURES.

- 1. Elementary Botany.
- 2. " Zoology.
- 3. Comparative Anatomy of Vertebrata.

B. PRACTICAL COURSES.

- 1. Elementary Biology with practical Botanical Demonstrations.
- 2. Histology.
- 3. Practical Physiology.

DEPARTMENT OF NATURAL PHILOSOPHY.

Lectures on Sound, Light, and Heat, with Laboratory work.

TIME-TABLE FOR STUDENTS OF FIRST YEAR.

	Term.	M.	T.	W.	Th.	F.
Inorganic Chemistry	1st.	11	11	11	11	11
Practical Chemistry	2nd.	10	10	10	10	.....
Organic Chemistry	2nd.	11	11	11	11	11
Botany	1st.	9	.....	9	.....	9
Zoology	2nd.	9	.....	9	.....	9
Natural Philosophy	1st.	.....	10	.....	10	.....
Comparative Anatomy of Vertebrata	1st.	10	.....	10	.....	.....
Practical Biology	Both.	.....	9	.....	9	.....

SYNOPSIS OF THE COURSES OF LECTURES

AND PRACTICAL INSTRUCTION GIVEN IN EACH DEPARTMENT,

WITH FEES FOR OCCASIONAL STUDENTS.

N.B. —Students who take the Practical Courses may attend the Lectures free of charge.

I. CHEMISTRY.

All the instruction in this subject is given in the School of Science.

“A.” COURSES OF LECTURES.

1. Elementary Chemistry, chiefly Inorganic and Chemical Physics.

Text-books.—Roscoe,
Fownes,
Bloxam,
Wilson,
Miller.

2. Organic Chemistry.

Text-books.—Fownes,
Wöhler,
Armstrong.

3. Applied Chemistry.

Text-books and Books of Reference.—Wagner's Technology,
Watts and Richardson.

“B.” PRACTICAL COURSES.

1. Preparation of Chemical Compounds.

Text-book.—Madan & Harcourt's Practical Chemistry.

Fee for Occasional Students, \$10.

2. Qualitative Analysis.

Text-books.—Fresenius' Qualitative Analysis,
Croft's Course of Practical Chemistry.

Fee for Occasional Students, \$10.

3. Quantitative Analysis.

Text-books and Books of Reference.—Fresenius' Quantitative Analysis,
Thorpe's Quantitative Analysis.
Normandy's Commercial Hand-book,
Bolley's Technologie,
Wanklyn's Works,
Sutton's Volumetric Analysis,
Fleischer's Volumetric Analysis.

Fee for Occasional Students, \$50.

4. Elementary Practical Course.

Text-book.—Bloxam's Laboratory Teaching.

Fee for Occasional Students, \$10.

5. Physiological Chemistry.

Text-book.—Hand-book for the Physiological Laboratory, Dr. Lauder-Brunton, pp. 421, 572.

For reference.—Hoppe-Seyler,
Neubauer and Vogel.

Fee for Medical Students, \$10.

6. Chemistry in relation to Hygiene and Forensic Medicine.

Text-book.—Taylor's Medical Jurisprudence.

For reference.—Otto's Ausmittelung der Gifte,
Dragendorff's Manuel de Toxicologie,
Gautier's Chimie appliquée à l'hygiène, &c

Fee for Medical Students, \$10.

For Regular Students going out in this department a considerable part of the third year will be spent in individual laboratory practice under the direction of the Professor and his assistant.

II. MINERALOGY AND GEOLOGY.

“A.” COURSES OF LECTURES (in University College).

1. Elementary Course.—Embracing Rudiments of Mineralogy, Physical Geography, Geology and Palæontology.

Text-Books and Books of Reference.—Page’s Physical Geography.

Johnston’s Elementary Physical Atlas.

Chapman’s Mineralogy and Geology of Canada, 2nd edition.

Dana’s Manual of Mineralogy.

Dana’s Text Book of Geology.

2. Intermediate Course.—Physical Geography and Geology.

Text Books and Books of Reference.—Synopsis of Chapman’s Lectures.

Wallace’s Distribution of Animals

3. Advanced Course.—Mineralogy and Crystallography.

Geology and Palæontology.

Mathematics of Crystallography.

Geology and Palæontology of Canada.

Text Books and Books of Reference.—Chapman’s Heads of Lectures.

Dana’s System of Mineralogy.

Chapman’s Outline of the Geology of Canada, 1876.

Nicholson’s Palæontology.

“B.” PRACTICAL COURSES (in School of Science).

1. Blowpipe Practice.—Chapman’s Outlines of Blowpipe Practice.

Fee for Occasional Students, \$10.

2. Blowpipe Analysis (Plattner’s Treatise), Determinative Mineralogy (Brush or Von Kobell’s tables). Economic Minerals of Ontario.

Kerl’s Leitfaden bei der qual. u. quant. Löthrohr-Untersuchungen, 2te Aufl.

Fee for Occasional Students, \$15.

3. Assaying. Mitchell’s Assaying, by Crooks.

Kerl’s Probirkunst.

Fee for Occasional Students, \$50.

4. Mining Geology.—Chapman’s Synopsis of Mining Geology.

Fee for Occasional Students, \$20.

III. MATHEMATICS AND NATURAL PHILOSOPHY.

“ A.” COURSE OF LECTURES (in University College).

“ B.” PRACTICAL INSTRUCTION IN NATURAL PHILOSOPHY (in School of Science).

IV. BIOLOGY.

“ A.” LECTURES (in University College).

1. Elementary Biology inclusive of Rudiments of Animal and Vegetable Morphology and Physiology.

Text-books.—Thomé's Botany,
Huxley's Physiology,
McAllister's Animal Morphology.

2. Cryptogamic Botany : a short course.

Text-book.—Sachs' Text-book of Botany.

3. Zoology.

Text-books.—Huxley's Invertebrata,
Claus' Zoologie,
Gegenbaur's Grundriss der vergleichenden Anatomie.

4. Comparative Anatomy of Vertebrata.

Text-book.—Huxley's Vertebrata.

For reference.—Owen's Vertebrata.

For diagnosis.—Jordan's Manual of American Vertebrates.

“ B.” PRACTICAL COURSE (in School of Science.)

1. Elementary Practical Biology, with use of Microscope and the study of Animal and Vegetable Tissues.

Text Books.—Huxley & Martin's Elementary Biology.
Schäfer's Histology.

2. Advanced Course.

Text Books.—Rolleston's Forms of Animal Life.

Various works of reference may be found in the Laboratory, as Carus' *Icones Zootomicæ*; Brühl, *Zootomie aller Thierclassen*; Bronn, *Classen und Ordnungen*; M. Edwards, *Leçons d'Anatomie comparée*; Nägeli und Schwendener, *Das Mikroskop*.

3. Specialised Course for study of Vertebrate Anatomy.

Works of Reference.—Foster and Balfour's *Elementary Embryology*.
Morphology of the Skull, Parker and Bettany.
 Krause, *Anatomie des Kaninchens*.
 Strauss Durckheim, *Anatomie du Chat*.

4. Histology for Medical Students.

Works of Reference.—Descriptive.—Introduction to Quain's *Anatomy*—8th ed.
 Strickers' *Manual of Histology*.
 Frey's *Histology and Histo-chemistry*.
 Technical.—Schäfer's *Practical Histology*.
 Klein, *Handbook for Physiological Laboratory*, pp. 1-163.
 Rutherford, *Histology*.
 Ranvier, *Traité technique d' Histologie*.

5. Practical Physiology.

(Not till 1879-80.)

To include Physiology of Blood, Circulation, Muscle and Nerve. *Handbook for Physiological Laboratory*, pp. 165-419.

V.—ENGINEERING.

SURVEYING.

FIRST YEAR.

a. *Lectures*—(for Students in Civil, Mechanical, and Mining Engineering)

- (1.) *Chain Surveys*.
- (2.) *Compass Surveys*.
- (3.) *Theodolite Surveys*.
- (4.) *Levelling*.

b. *Field-work*.—(for Students in Civil Mechanical and Mining Engineering).

A survey with the chain only, and methods of keeping surveyor's note-books. A compass survey. Plotting from notes.

SECOND YEAR.

a. Lectures.—(for students in Civil Engineering).

Geodesy and Astronomy.

(Easter Term only.)

b. Field Work.—(for students in Civil and Mining Engineering).

A theodolite and a trigonometrical survey. Running of profiles and cross-sectioning. Plotting of surveys made.

Text Book.—Gillespie's Land Surveying.

DRAWING.

(For Students in Civil, Mechanical, and Mining Engineering.)

FIRST YEAR.

Mechanical drawing.—(As in Davidson's "Linear Drawing" and "Orthographic Projection.")

Free-hand drawing.—Plans, elevations and sections of models, drawn approximately to scale.

SECOND YEAR.

Mechanical drawing.—Perspective Projection (as in Davidson's "Perspective"), Isometrical Projection, Descriptive Geometry (with demonstrations on the blackboard), map drawing.

Free-hand drawing.—Drawings from models.

THIRD YEAR.

Free-hand drawing.—Drawings and sketches of structures and machines made approximately to scale. Finished drawings made from sketches.

Text Books.—Davidson's Linear Drawing.

“ Orthographic Projection.

“ Perspective Projection.

MENSURATION.

FIRST YEAR.

(For Students in Civil, Mechanical, and Mining Engineering.)

Lines. Surfaces. Solids. Estimating.

CONSTRUCTION.

FIRST YEAR.

(For Students in Civil, Mechanical, and Mining Engineering.)

Carpentry. Masonry. Iron-work. Processes employed in the execution of works.

SECOND OR THIRD YEAR.

(To be delivered to Students of the Second and Third Years together in alternate years.)

(For Students in Civil Engineering.)

a. Lectures. Roads and Railways.

b. Designing and Estimates.

SECOND OR THIRD YEAR.

(To be delivered to Students of the Second and Third Years together in alternate years.)

(For Students in Civil Engineering.)

a. Lectures. Canals and Harbours.

b. Designing and Estimates.

Text Books.—Rankin's "Civil Engineering."

Vose's "Railway Construction."

Stevenson's "Canals."

" " Harbour construction.'

Debauve "Navigation interieure."

" " Travaux maritimes."

MACHINERY AND MECHANISM.

SECOND YEAR.

(For Students in Mechanical Engineering.)

Wood-working machinery, Iron-working machinery, &c.

Text-Books.—Rankin's Machinery and Mill-work.

Shelley's Workshop appliances.

Goodeve's Elements of Mechanism.

Bourne, The Steam Engine.

BRIDGES.

SECOND YEAR.

(For Civil Engineers.)

Roofs, Beam Bridges, Timber, Iron, Suspension and Arched Bridges, &c.

b. Calculation and Designing.—(Graphical methods of calculation. Stress diagrams. Designs of timber and iron bridges and viaducts.)

APPLIED MECHANICS AND HYDRAULICS.

THIRD YEAR.

(For Students in Civil and Mechanical Engineering.)

Mechanics.—Theory of elasticity.

Resistance of surfaces. Lock gates. Hollow spheres and cylinders under exterior and interior pressure.

Masonry arches.

Reservoir walls, &c.

Hydraulics.—Bernouilli's theorem. Flow from orifices. Flow in pipes. Water supply of towns.

Flow in open channels. Mean and surface velocity. Inclination and velocity. Gauging of streams and rivers.

Motion of gases. Pneumatic railways.

STEAM AND HYDRAULIC MACHINERY.

THIRD YEAR.

(For Students in Civil, Mechanical and Mining Engineering.)

a. Lectures. Steam Engines.—Properties of gases and vapours. Production and distribution of steam. Condensation. Transmission. Pumping machinery, &c.

Hydraulic Engines. Water power. Water-wheels. Turbines. Pumping machinery.

(For Mechanical Engineers.)

b. Designing. Circular diagrams. Studies of steam distribution. Designing of steam cylinders, and of horizontal and beam engines.

MACHINES.

THIRD YEAR.

(For Students in Mechanical Engineering.)

Stresses in moving parts.

Parts without motion subjected to suddenly reversed stresses.

Parts having a reciprocating motion.

Parts having a circular motion.

INSTRUCTION IN MODERN LANGUAGES.

The classes of French and German in University College (see regulation 9), are open free of extra charge to the Students of the Regular Courses. No special examinations are held in these languages, but it is expected that every Student of a Regular Course should be able to acquaint himself with the contents of any of the works necessary to his profession, written in these languages. Such books may be prescribed for the terminal examinations.

LIBRARIES, MUSEUMS, &C.

The Library of the school is well provided with works bearing upon the more technical parts of the Regular Courses. It is furnished with a full set of Specifications of Inventions from the British and Canada Patent Offices.

It is open to Regular Students under certain restrictions imposed by the Board.

The Library, Museums and Herbarium of the University of Toronto are open to Regular Students.

